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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/856,422	12/13/2001	Zvi Kam	U013475-2	7739

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LADAS & PARRY  
26 WEST 61ST STREET  
NEW YORK, NY 10023

EXAMINER

WERNER, BRIAN P

ART UNIT	PAPER NUMBER
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2624

DATE MAILED: 07/28/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

<b>Office Action Summary</b>	<b>Application No.</b> 09/856,422	<b>Applicant(s)</b> KAM, ZVI	
	<b>Examiner</b> Brian P. Werner	<b>Art Unit</b> 2621	

**-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --**

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 04 May 2006.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 34,35 and 38-41 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 34,35 and 38-41 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)  | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                                   | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

## **DETAILED ACTION**

### ***Priority***

1. This application is a national stage application of PCT/IL99/00645 filed on November 30, 1999, which claims priority to Israel application 127359, filed on December 1, 1998.

### ***Continued Examination Under 37 CFR 1.114***

2. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on February 10, 2006 has been entered. Claims 34, 35 and 38-41 are currently pending.

### ***Drawings***

3. The drawing corrections received on February 22, 2005 are accepted.

*Claim Rejections - 35 USC § 102*

4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

(c) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

5. Claims 34 and 35 are rejected under 35 U.S.C. 102(a) as being anticipated by Kagalwala et al. (Computational model of DIC microscopy for reconstructing 3-D specimens: from observations to measurement).

Kagalwala disclose a method and apparatus (the apparatus is implicit; Kagalwala's description of practicing his method would have suggested the apparatus to one skilled in the art) for ray tracing ("we trace rays" at page 35, middle column, bottom paragraph) through a medium having multiple variations in refractive index ("images of a specimen" and "index distribution" at page 35, middle column, top paragraph) including:

an image information acquirer ("DIC microscope" at page 35, middle column, first paragraph) providing information relating to local refractive index variations at any multiplicity of three dimensional locations in said medium (met by Kagalwala in two ways: 1) "estimate the specimen's refractive index distribution" at page 35, middle column, bottom paragraph; and 2) "optically-sectioned DIC microscope images" at page 35, middle column, first paragraph; every

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optically sectioned image is a depiction of the local distribution of indices of refraction, as depicted in applicant's "prior art" figure 2), said local refractive index variations being determined by either one of differential interference contrast (DIC) imaging and phase microscopy (as above, "DIC microscope"); and

a computer (implicit to Kagalwala's "quantitative" reconstruction at page 35, left column, bottom paragraph; see "reconstruct" at page 35, middle column, first paragraph and "compute" at page 35, middle column, bottom paragraph) employing an analytically determined path of a ray through the multiplicity of three dimensional locations in the medium ("compute the propagation of light through the object"; "we trace rays"; "we model multiple scatterings through the object"; all at page 35, middle column, bottom paragraph), for a plurality of rays impinging thereon in different directions ("we model multiple scatterings through the object"; all at page 35, middle column, bottom paragraph), by utilizing said determined local variations of the refractive index at said multiplicity of three dimensional locations in the medium (the ray tracing is based on the captured optically sectioned images described above; every optically sectioned image is a depiction of the local distribution of indices of refraction, as depicted in applicant's "prior art" figure 2 ).

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6. Claims 40 and 41 are rejected under 35 U.S.C. 102(e) as being anticipated by Wolleschensky et al. (US 6,771,417 B1). Wolleschensky teaches adaptive optics to correct for indices of refraction in a sample (column 1, lines 10-19 and 60-68, column 2, lines 7-15 and 30-33, column 3, line 58, column 4, lines 1-4, column 7, lines 55-62, column 8, lines 3-33 and lines 58-62).

***Claim Rejections - 35 USC § 103***

7. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

8. Claims 40 and 41 are rejected under 35 U.S.C. 103(a) as being unpatentable over the combination of White et al. (Aberration control in quantitative imaging of botanical specimens by multidimensional fluorescence microscopy) and Clark et al. (US 6,384,952 B1).

White discloses a method for confocal microscopy comprising the steps of:

providing a confocal microscope (“confocal systems” at page 99, Summary) having an image information acquirer (“confocal measurements” at page 99, Summary; “Confocal microscopy was carried out with out modified Bio-Rad MRC 600 system” at page 105, left column, bottom paragraph; the fact that confocal measurements are taken would have suggested to one skilled in the art that an image information acquirer was present) providing information

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relating to variations in the refractive index in a three-dimensional imaged volume (“Three-dimensional (x,y,z) volume images” and “section images” at page 105, right column, top paragraph; any image data depicted in a slice image is necessarily caused by and necessarily depicts variations of the indices of refraction within the specimen for each slice; e.g., refer to applicant’s prior art figure 2), said microscope having an imaging path between a three-dimensional sample and said image information acquirer (inherent to a confocal microscope).

While White discloses correction for aberrations resulting from variations of the index of refraction of the three dimensional sample (“sample aberrations” at page 99, Summary; “estimation and correction of aberrations in confocal imaging” at page 99, Introduction, last sentence) by physically altering the measurement procedure (“spatial corrections ... interactively changing the parameters used for measurements along the z-axis” at page 109, left column, first sentence), White does not disclose:

disposing in said imaging path a three-dimensional medium with refractive properties that correcting the aberrations.

Clark discloses a system of “adaptive optics” (column 1, line 19) for confocal microscopes (“confocal microscopes” at column 2, line 17), for correcting aberrations “aberration” at column 1, line 59; “correcting for these effects” at column 2, line 10), comprising disposing in the imaging path a three-dimensional medium with refractive properties that corrects for the aberrations (“a deformable mirror to apply the correction” at column 2, line 48).

It would have been obvious at the time the invention was made to one of ordinary skill in the art to provide the confocal microscope of White with the adaptive optics taught by Clark, in

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order to correct for White's aberrations to thereby enhance the optical performance of the microscope ("enhance the operational performance of the clinical microscopes in use today" at Clark, column 2, line 19) by correcting for wavefront distortion ("corrected wave" at White column 1, line 63)

9. Claims 38 and 39 are rejected under 35 U.S.C. 103(a) as being unpatentable over the combination of Clark et al. (US 6,384,952 B1) and Kagalwala et al. (Computational model of DIC microscopy for reconstructing 3-D specimens: from observations to measurement).

Clark discloses a system of "adaptive optics" (column 1, line 19) for confocal microscopes ("confocal microscopes" at column 2, line 17), for determining an aberrated wavefront ("wavefront sensor 120 detects any aberration" at column 1, line 56), and correcting aberrations "aberration" at column 1, line 59; "correcting for these effects" at column 2, line 10), comprising disposing in the imaging path a three-dimensional medium with refractive properties that corrections for the aberrations resulting from the refractive index variations in the sample ("a deformable mirror to apply the correction" at column 2, line 48). It is noted that aberrations caused by indices of refraction in confocal microscopy are inherent (i.e., as describe by the applicant in the background section of the specification and by White above).

While Clark does not describe the ray tracing of claims 34 and 35 to determine the aberrated wavefront, Kagalwala does as described above in the rejection of claims 34 and 35.

It would have been obvious at the time the invention was made to one of ordinary skill in the art to utilize the method of quantitatively calculating the aberrated wavefront of Kagalwala, as the method of determining the aberrated wavefront of Clark, in order to more accurately



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determine any aberrations through ray tracing and modeling (“accurately” at Kagalwala page 35, right column, top paragraph) and refined estimation (“iterative non-linear optimization” at Kagalwala page 35, right column, top paragraph).

***Response to Arguments***

10. Applicant’s argument regarding the prior art are moot in view of the new grounds of rejection. Applicant’s arguments regarding the previous 112 rejections are convincing, and those rejections are now withdrawn.

11. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Brian P. Werner whose telephone number is 571-272-7401. The examiner can normally be reached on M-F, 8:00 - 4:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner’s supervisor, Matthew C. Bella can be reached on (571) 272-7778. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Brian Werner  
Primary Examiner  
Art Unit 2624  
July 21, 2006



**BRIAN WERNER**  
**PRIMARY EXAMINER**